Projecting Bird Numbers and Habitat Conditions into the Future: *Introductory Remarks*

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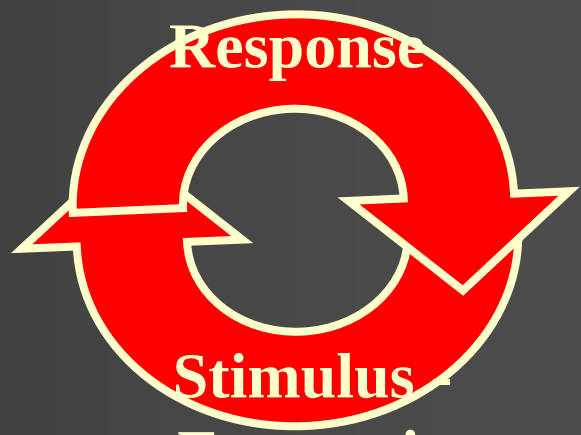
Public Response

There is no perceived environmental crisis

Stimulus - Environmental Degradation




2.4 million acres of emergent and forested wetlands
180,000 acres of freshwater wetlands
1982
2004
Conservation is not regarded as a legitimate form of business, nor are environmental goods and services viewed as legitimate business products to be bought and sold
From
➢$144 billion in farming subsidies
versus
➢$19 billion in conservation programs

Interim Summary

Problem – There is no widely perceived environmental crisis

Solution – Market the crisis in terms of costs to individuals and rural communities

Problem – Environmental degradation is not viewed as an economic or public health problem

Solution – Highlight hidden costs to tax payers of flooding, water treatment, added health costs, climate and weather changes

Problem – Conservation isn't regarded as legitimate business

Solution – Promote clean air, water, carbon sequestration and wildlife as business products by compensating entrepreneurial landowners that provide them

We need a corporate approach to conservation

1. Clearly define corporate goals

2. Assemble the expertise to:
    1. Develop a corporate (conservation) strategy (their product)
    2. Aggressively market their product

Human Assets – Strategy Development
Biological planners
Spatial analysts
Sociologists
Hydrologists
Agronomists
Economists

Human Assets – Marketing
Advertising specialists
Lobbyist
Communication specialists

Projecting Bird Numbers into the Future

Population Ecology Basics

$$P_{t+1} = P_t + B - D$$

$$\Delta P = P_{t+x} - P_t \qquad \Delta P / x = \text{Trend}$$

$$\Delta P = B - D$$

Population Ecology Basics

$$\Delta P = B - D$$

Positive $\Delta P = B > D$

Negative $\Delta P = B < D$

To estimate ΔP

Must know **B** and **D**

That is, must know

recruitment = ***R***

and

survival = ***S***

Among ΔP, ***R***, and ***S***, knowing 2 parameters enables estimation of the 3rd.

Among ΔP, r, and s, knowing 2 parameters enables estimation of the 3rd.

Thus, if we know ΔP and S we can estimate R

if we know ΔP and R we can estimate S

if we know S and R we can estimate ΔP

Can we estimate ΔP, R, *or* S?

ΔP **can be stated as our population objective**

i.e., number of birds or slope (trend or rate of change)

However, other measurable population indices also will suffice as population objectives

If ΔP is our population objective,

do we focus on estimating *R* or *S*?

Estimate background levels of one parameter
and
Use strategic conservation actions to affect the other

So which do we focus on affecting?

Projecting Bird Numbers and Habitat Conditions into the Future

Implicitly assumes that *R* and *S* are related to Habitat Conditions

If this assumption is true, our first challenge is to understand the relationships between habitat, recruitment and survival

A comprehensive regional population objective, e.g.,

1.5 million breeding pairs of mallards, with a recruitment rate of 0.6

has 2 components:

Part 1 (p1) – 1.5 million mallard pairs

Part 2 (p2) – a recruitment rate of 0.6

Do we focus on affecting *R* or *S*?

Is *R* or *S* more limiting to ΔP?

What proximal factors limit *R* and *S*?

e.g., *R* – habitat abundance and configuration
_S_ – human take and predation

What factors are most manageable, i.e., what legal authorities, programs and management treatments are available?

Once we decide which vital rate to try to affect through management ……

…….. we still have to estimate the other to know how much management is necessary……..

…….. and we need estimates of both

Have to know S to determine how big R must be to reach objective ΔP and vice versa

R has 2 components:

- r = recruitment rate; and
- N = population size (abundance)

S has 2 components:

- S = survival rate; and
- N = population size (abundance)

In summary – increasing the size of a population requires that, over time, more individuals hatch than die, i.e.,

Positive $\Delta P = B > D$

Positive $\Delta P = R > 1\text{-}S$

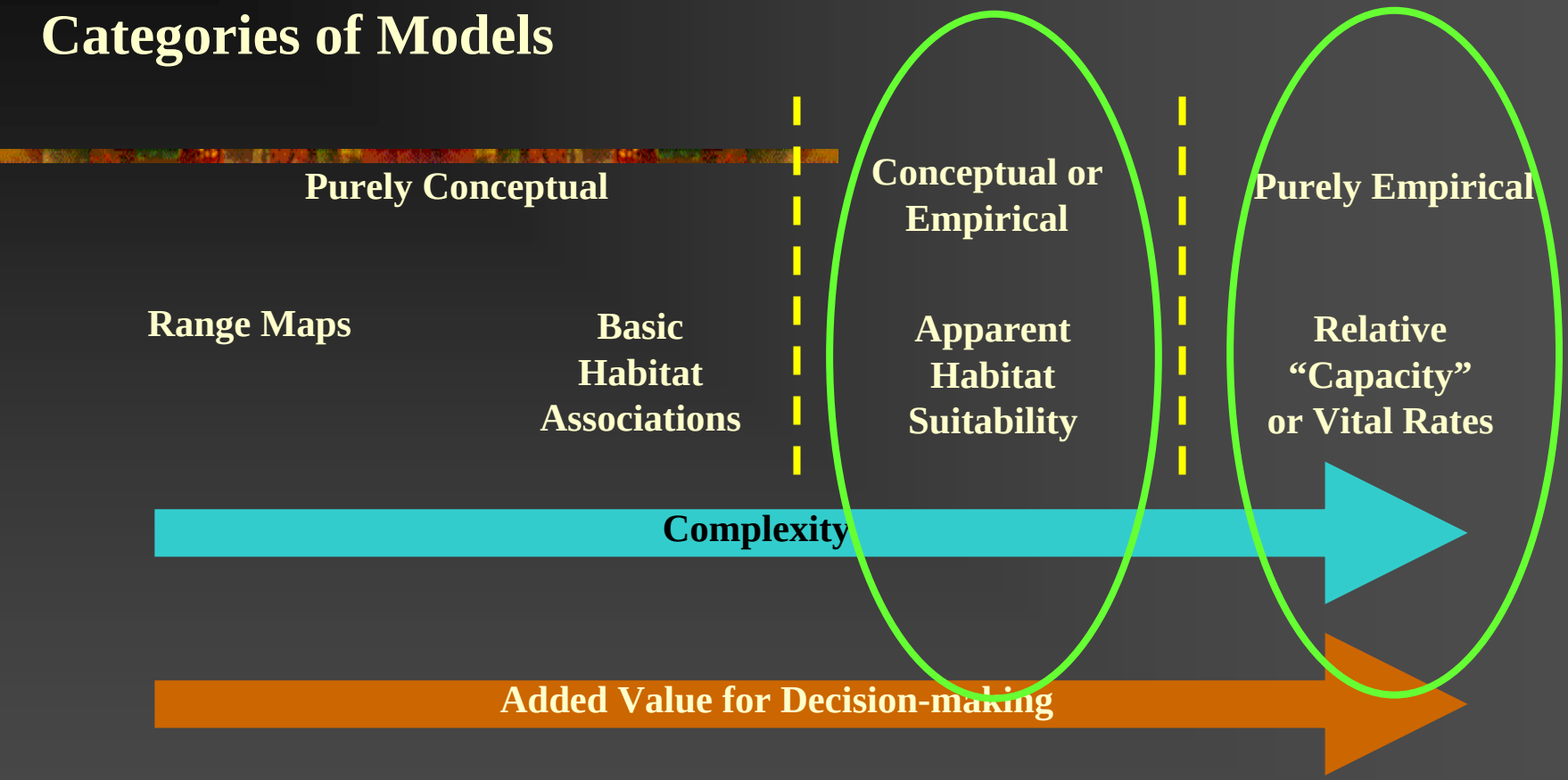
Our job as conservation professionals is to determine whether *R* or *S* can be manipulated more efficiently and

to develop the capability to predict the effects of management actions on that vital rate

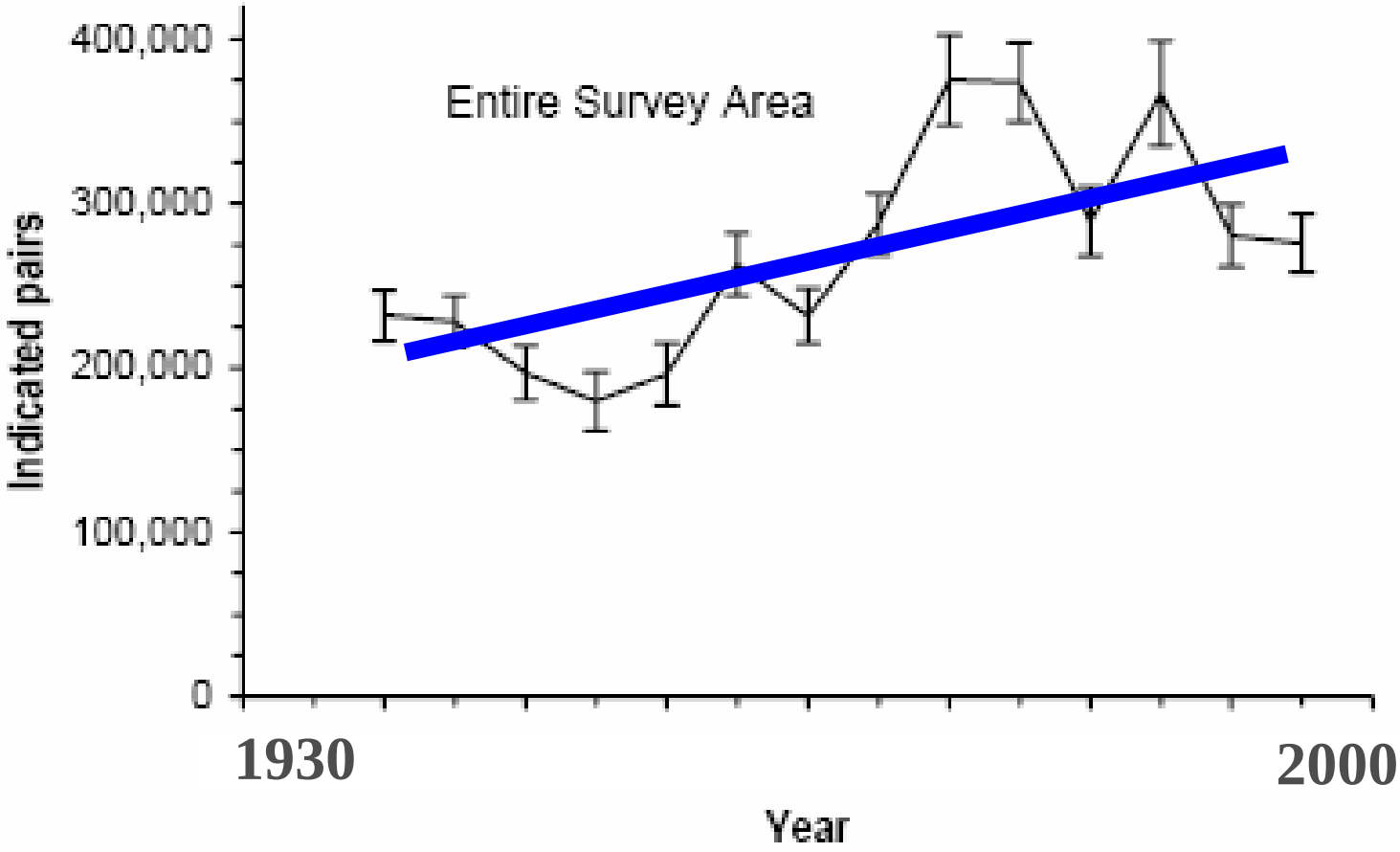
and the capacity to monitor the other

The Purpose Of Models Is To Improve The Reliability Of Management Decisions

Categories of Models



A Model's Value is Measured By The Degree To Which It Adds Information To The Decision Making Process


Entire Survey Area
400,000
300,000
200,000
100,000
0
Indicated pairs
1930
2000
Year

Improving our predictive capacity for non-game birds

Picking a small number of focal species and doing a better job of estimating vital rates – *r and s* – via targeted research and eventually operational monitoring (e.g., recent coordinated mourning dove research) rather than devoting our collective efforts to trying to monitor status and trends of all species without understanding the dynamics of population and habitat change.

We can do a better job of anticipating and dealing with emerging risks to habitats and populations; however,

the conservation planning process must be less insular and more multi-disciplinary

With the right information on the mechanisms by which populations respond to habitat changes, and with the proper multi-disciplinary planning partnerships, we really can see into the future and manage accordingly.